BIBLIOGRAPHICAL NOTICES.

The Student's Manual of Geology. By J. Beete Jukes, M.A., F.R.S. New Edition. 1862.

The order of the subjects in this Manual is well adapted to the requirements of the student. Firstly, we have the facts and principles respecting the internal structure of rocks, their mineral composition, texture, and other characters, such as may be recognized by the aid of hand-specimens in the cabinet. This is the Lithological division of the work. Under "Petrology" the author arranges the study of rock-masses, their strata and joints, and the mutual relations of rocks; this has reference to field-geology. Fossils, their relation to living forms, and the distribution of life in time and space, are next brought forward as Palæontology. The history of the formation of the crust of the globe, with the chronological classification of rocks and fossils, forms the fourth and last division.

Each class of subjects above indicated is systematically and carefully treated, and the requirements of the student are kept well in view. The chemical and mineralogical chapters, however, are not intended to supersede special manuals on mineralogy. The chapters on the formation of rocks, chemical, igneous, and aqueous, contain much instructive matter, carefully arranged and digested from the special works of Cotta, Durocher, Naumann, and others. But the author's genuine geological experience and personal acquaintance with rocks of every kind enable him, in this as in other divisions of the work, to present good and well-arranged material for the student. There are few works (excepting perhaps Prof. Phillips's Manual) that treat so well of stratification and the nature of joints and cleavage as this work; and in this case also we have the advantage of the author's wide experience in the field. The palæontological portion taken together with the concluding division, that relating to geological classification, is of itself a manual of much value; and these chapters are the better on account of the diagrams, illustrative of the geological order of the formations, being really sections, and the figures of the fossils being newly and carefully selected by an experienced palæontologist. Indeed, throughout his work Mr. Jukes has availed himself (with full acknowledgments) of the friendly help of his colleagues in the Geological Survey and the Museum of Irish Industry, with the best results. The 'Manual' is greatly improved in this second edition: the author has been able to work up more closely to his original conception of what geological students now-a-days require, and he has made those corrections which former oversight and the continual advance of geological observation have made requisite.

The relations of granite both to metamorphic and to unaltered strata have careful consideration in this Manual, and, when compared with the teaching of older works, have a certain freshness of treatment which is pleasant to find, and is redolent of truth as far as observed facts go. Possibly, however, sufficient credit is not given to the views of Naumann and Scrope on the original plasticity of

some of the gneissic rocks associated with granite. The true relationship of granite, trap-rocks, and lava is another important point prominently brought forward. The "form of ground," or modification of the surface, has also had much attention from the author, who has just recently produced a masterly essay on the origin of the great valley-systems of the South of Ireland, which he considers to have been mainly produced by atmospheric agencies.

A large portion of the book is devoted to palæontological subjects (pp. 373–710); and the treatment of this branch of the science, which is not one of the author's "specialties," and is itself far from perfection, allows of critical animadversion to a greater extent than any of the other chapters. Of the very numerous errors in the orthography, especially of the technical terms, the author has corrected many; we do not propose to point out any of the others, excepting "Emmonds," a mis-spelling for Emmons, at pp. 438, 457, &c., and especially "Guep," disguising the good Viennese geologist Suess (p. 555). Mr. Jukes is usually careful to mention his authorities and sources of information, and the discoverers of facts and originators of good theories; we regret, however, to see the omission, no doubt inadvertent, of Hislop's name in connexion with the coal-bearing beds of Central India (p. 533), and of Harkness when the Permian age of the Ichnites of Corncockle Muir are referred to (p. 546). The chapter on the Triassic or New Red Sandstone Period will require careful revision in a new edition of the Manual; for the reptilian *Placodus* is enumerated among the Fishes (page 548), and the *Microlestes* of Stuttgart is kept in the Keuper, though stated in the same page (541) to have been found in an osseous breccia equivalent (as is well known) to the infra-liassic Bone-bed of England, which is duly assigned to the Rhætic Series at page 555. Not only the *Microlestes*, but the other osseous remains from these bone-beds, English and German, are reckoned as truly Triassic; and at pages 555 and 560, the mistaken position of *Microlestes* is repeated, and said to be in the Keuper. Dr. Plieninger found his specimens in the bone-bed above the Keuper; and Mr. C. Moore found his in a cleft of the Mountain-limestone filled with drifted material derived from the limestone, the Rhætic bone-bed, and the Oolite.

Palæontology (to say nothing of palæobotany) now finds work for very many separate naturalists, taking up their attention, more or less fully, by this or that class of animal, recent and fossil; and it is impossible for one man to construct a correct Palæontological Manual: the latest English Manual of Palæontology proves our statement. Let Mr. Jukes, therefore, in his next edition of his Manual, get the combined assistance of his many palæontological friends to critically examine his lists of fossils; otherwise he may almost despair of ever effecting more than a patchwork of chronological geology.

In the other parts of the Manual there are still a few things to be noticed. At p. 174, flint and chert are said to be derived "probably from animals;" certainly it should be *animals and plants*, if not *plants* alone. At pp. 166 and 175, certain limestones are said to be

"saccharine;" the sugar-character of the rock being more readily recognizable by the sight than the taste, we think the accepted term "saccharoid" better in every respect. Lastly, we believe that, by referring to some of the "Explanations of Maps and Sections," of the Geological Survey, relating to Wilts and Oxfordshire, Mr. Jukes will find that his proposed term "Inlier" (p. 201) has already been invented by some of his colleagues as a good and useful word for valleys-of-elevation and such like.

Few of the foregoing remarks at all affect the intrinsic value of the 'Student's Manual of Geology.' It is a good work, already enhanced by careful emendations and by the detersive process of being re-edited by an author who has truth alone in view whilst striving to serve the rising generation in mastering the intricate history of the globe,—a task becoming more and more necessary for the young, from the exigencies of the period, and more and more useful to man in every part of the globe.

An Appendix "On Geological Surveying," of considerable value, and a full Index, which is also glossarial, complete the work. We think that a careful pruning of the theoretical portions, and condensation of some descriptive parts, will be required to balance the additional information that the author must have accumulated, however soon a new edition of this really serviceable Manual is called for.

The Coal-fields of Great Britain: their History, Structure, and Resources. With Notices of the Coal-fields of other parts of the World. By Edward Hull, B.A. With Map and Illustrations. Second Edition, 1861.

The history of coal-mining affords an interesting chapter at the commencement of this little volume. Possibly used by the aborigines, coal seems to have been worked in Britain by the Romans, and was certainly in household use among the Saxons, and has continued to be an article of commerce, with a gradually increasing consumption, until the quantity now annually raised from the British area alone is nearly 80,000,000 tons. The difficulties in arriving at exact information as to the quantity of coal raised in Great Britain and Ireland are being mastered by the energy of the Mining Record Office; and an approach to an exact knowledge of the extent and thickness of the available coal-seams is being gradually made by the Geological Survey,—the labours of previous as well as contemporary geologists, and the willing co-operation of coal-owners and practical coal-workers, aiding these researches to a very great extent. To put together in a tangible form the results of the elaborate coal-statistics already made, and to define with anything like accuracy the coal-areas, so that the scientific geologist might have a useful work of reference, and the public be supplied with a compendious and readable treatise, was a laudable and somewhat difficult undertaking. Mr. E. Hull, one of the Geological Surveyors, and hence personally acquainted with the real character and condition of some of the English coal-fields, boldly took in hand the large and important